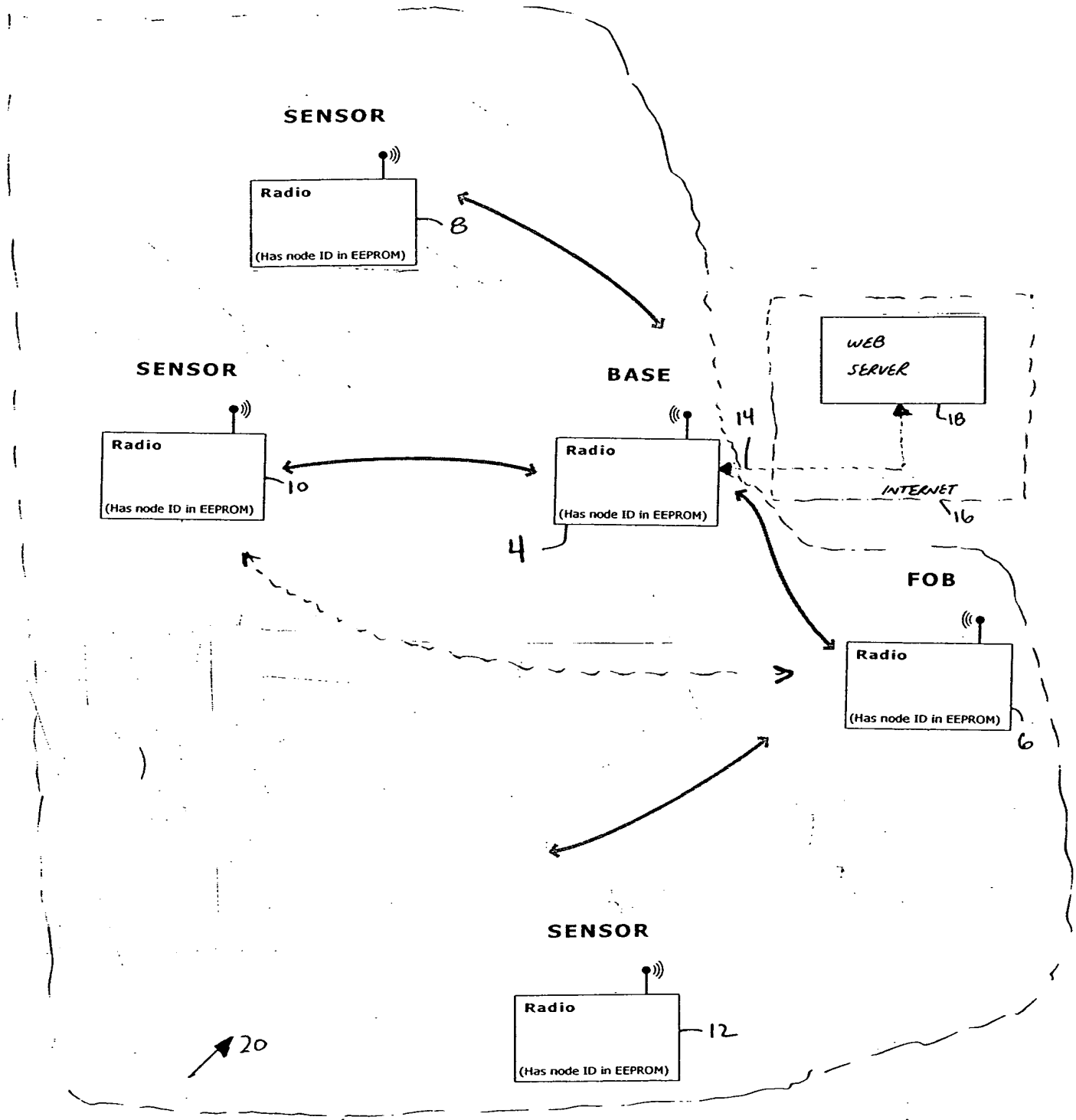

SENSOR
Radio
(Has node ID in EEPROM)
8
SENSOR
Radio
(Has node ID in EEPROM)
10
BASE
Radio
(Has node ID in EEPROM)
4
14
WEB SERVER
18
INTERNET
16
FOB
Radio
(Has node ID in EEPROM)
6
SENSOR
Radio
(Has node ID in EEPROM)
12
20
2

FIG. 1

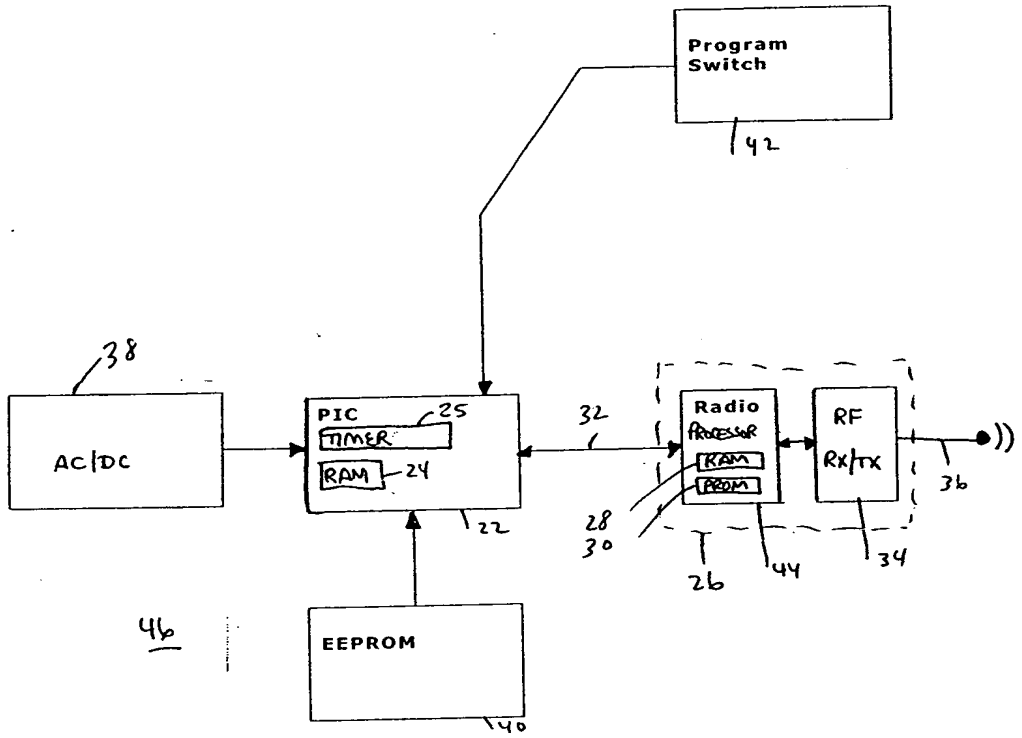


FIG. 2B

46

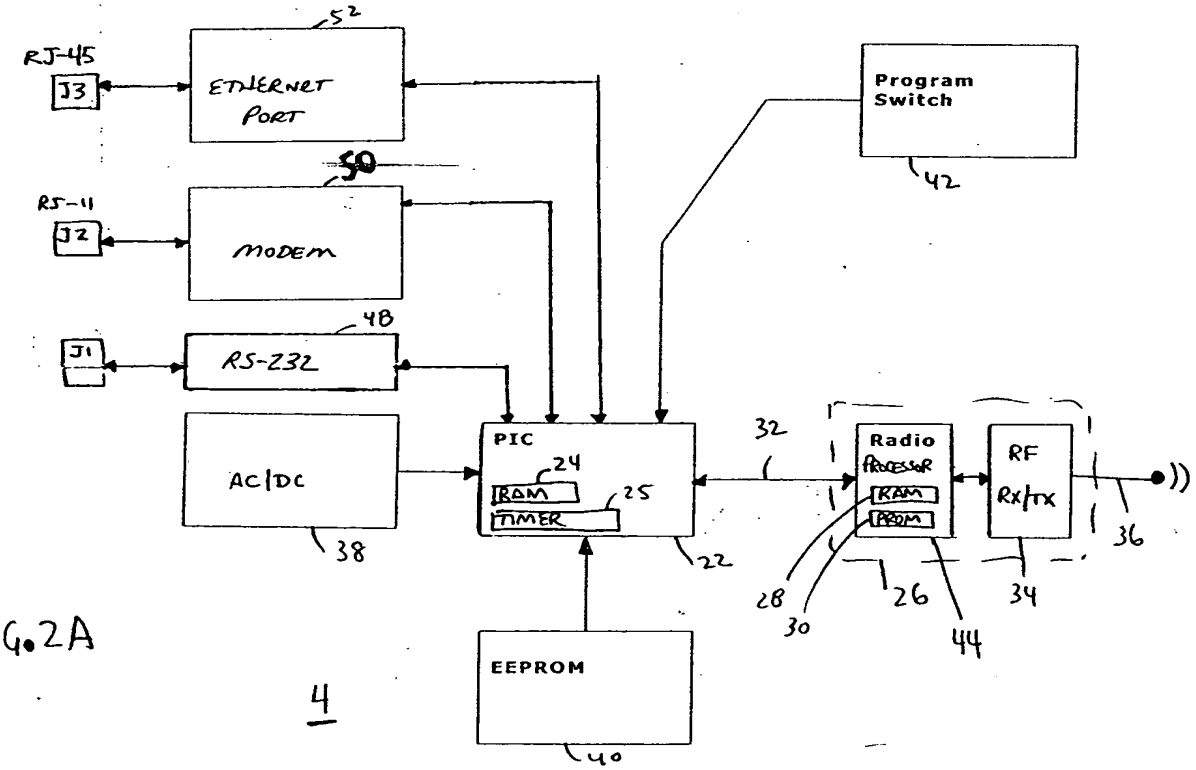


FIG. 2A

4

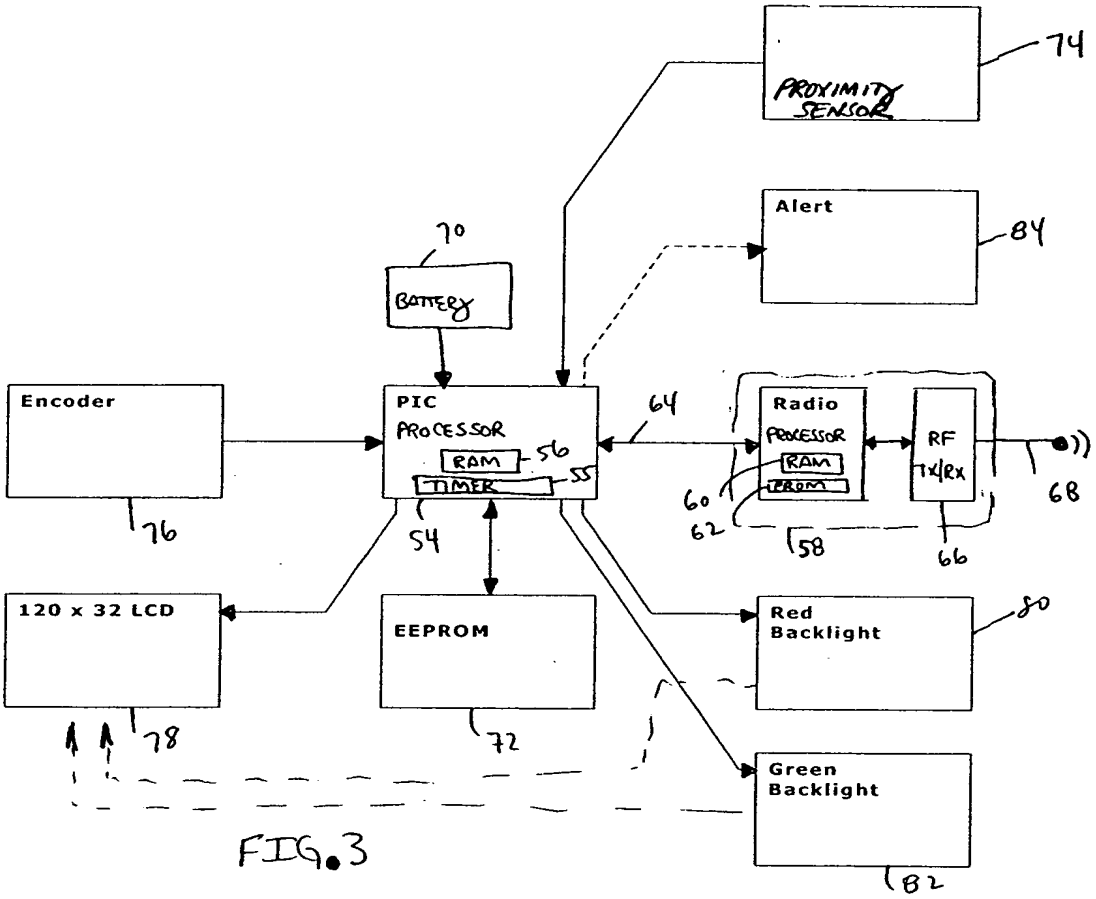

PROXIMITY SENSOR
74
Alert
84
70
BATTERY
Encoder
PIC
PROCESSOR
RAM
56
TIMER
55
64
Radio
PROCESSOR
RAM
EPROM
RF
TX/RX
60
62
58
66
68
76
54
120 x 32 LCD
EEPROM
Red
Backlight
80
Green
Backlight
78
72
82

FIG. 3

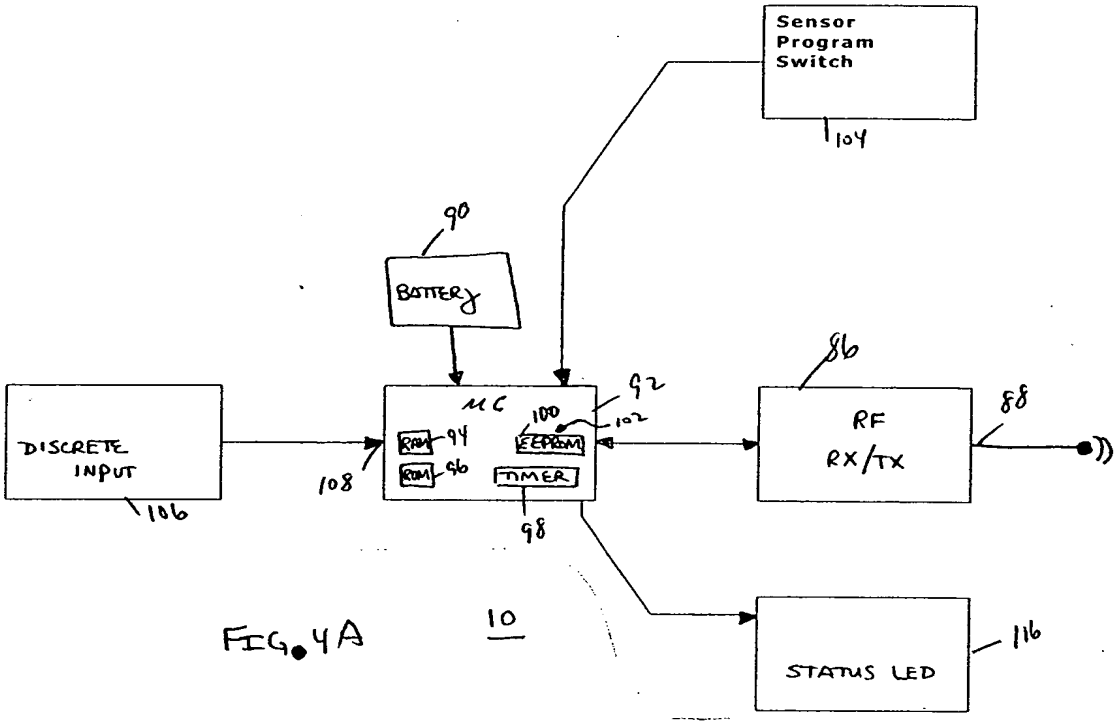


FIG. 4A

10

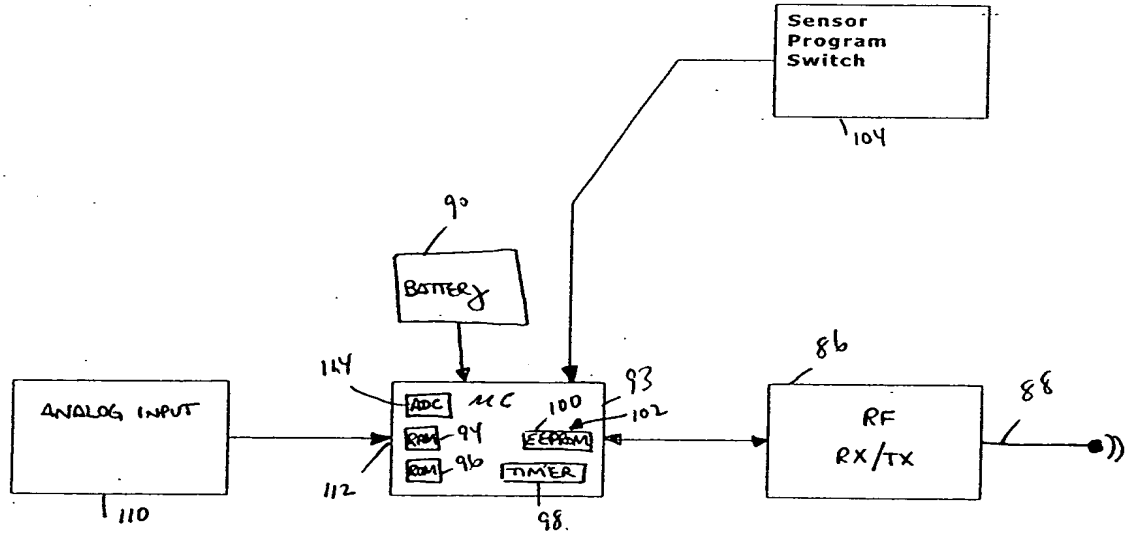


FIG. 4B

8

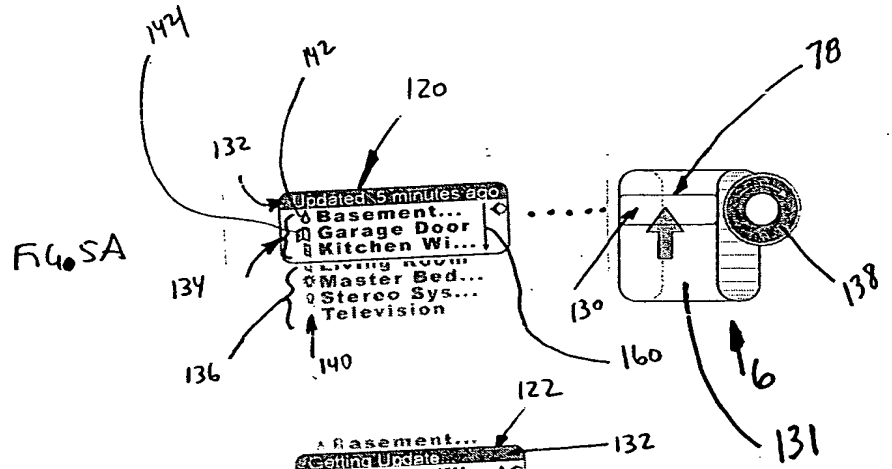


FIG. 5A

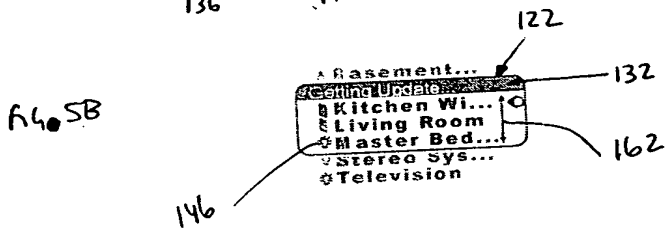


FIG. 5B

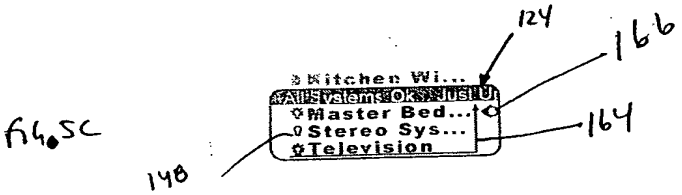


FIG. 5C

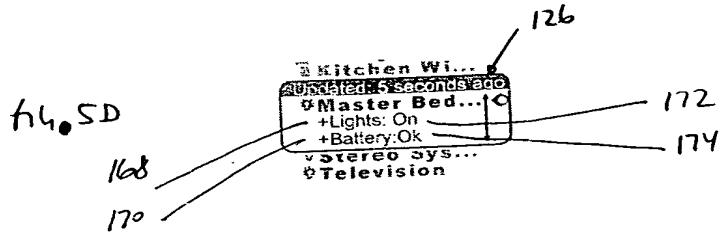


FIG. 5D

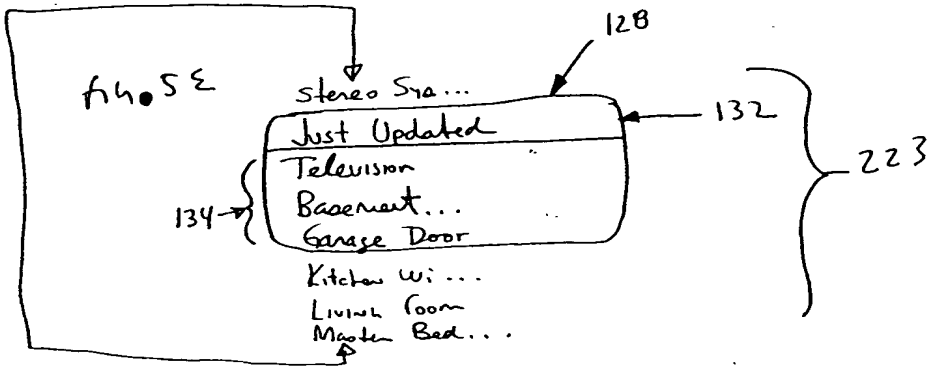


FIG. 5E

FIG. 5F

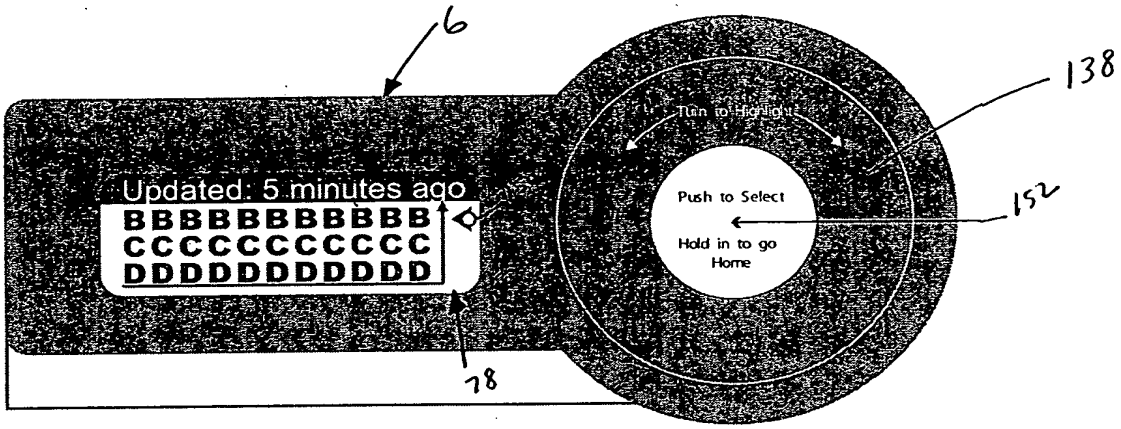
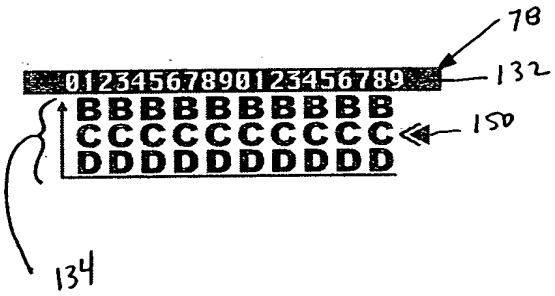

6
138
Turn to Highlight
Updated: 5 minutes ago
BBBBBBBBBBB
CCCCCCCCCCC
DDDDDDDDDDD
Push to Select
Hold in to go Home
152
78

FIG. 5G


78
0123456789012345678 9
132
BBBBBBBBBB
CCCCCCCCCCC
DDDDDDDDDDD
150
134

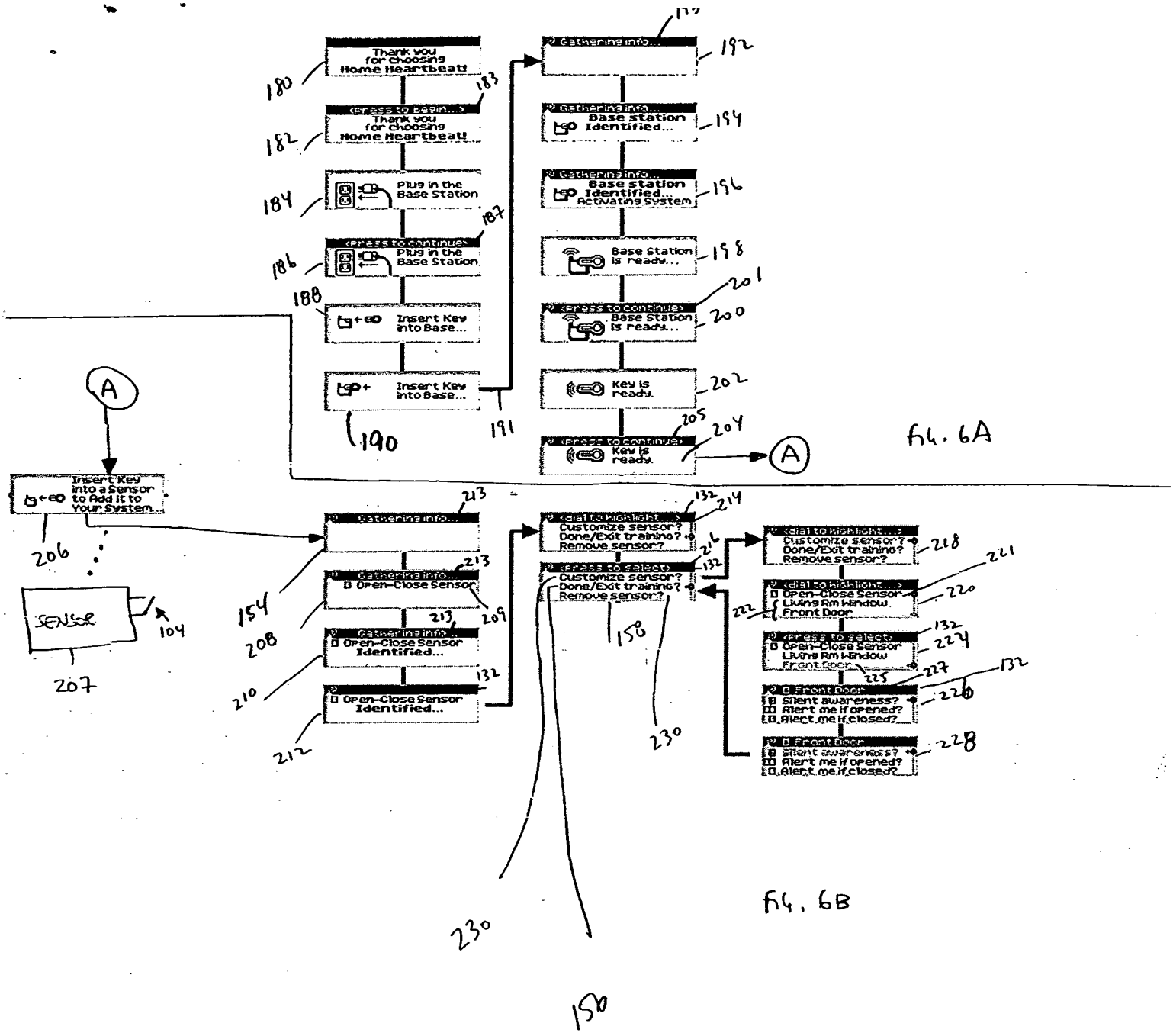
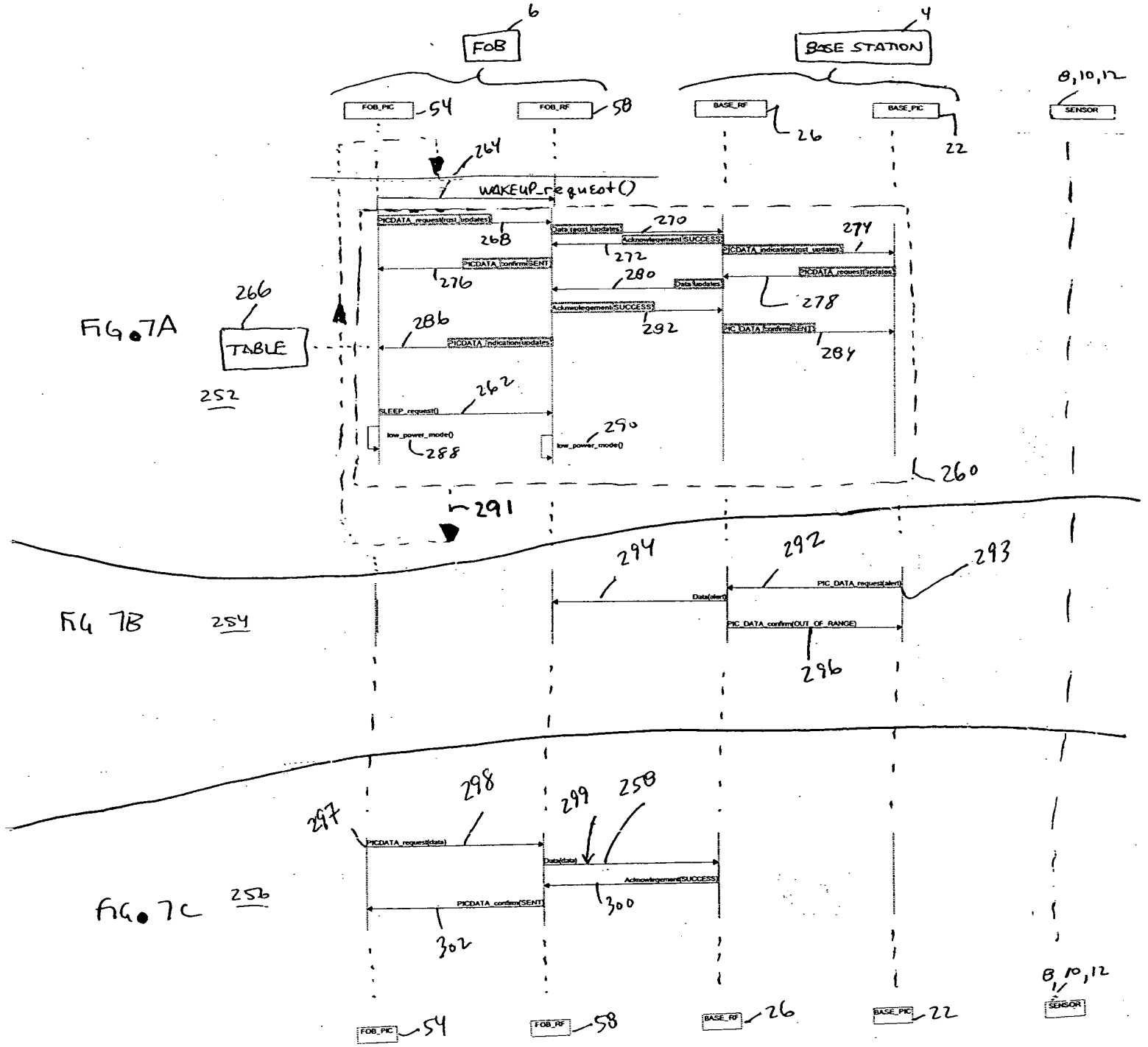

Thank you for choosing Home Heartbeat!
<press to begin...>
Thank you for choosing Home Heartbeat!
Plug in the Base Station
<press to continue>
Plug in the Base Station
Insert Key into Base...
Insert Key into Base...
Gathering info...
Gathering info...
Base station Identified...
Gathering info...
Base station Identified... Activating System
Base Station is ready...
<press to continue>
Base Station is ready...
Key is ready.
<press to continue>
Key is ready.
A
Insert Key into a Sensor to Add it to Your System...
SENSOR
Gathering info...
Gathering info...
Open-Close Sensor
Gathering info...
Open-Close Sensor Identified...
Open-Close Sensor Identified...
<dial to highlight...>
Customize sensor?
Done/Exit training?
Remove sensor?
<press to select>
Customize sensor?
Done/Exit training?
Remove sensor?
<dial to highlight...>
Customize sensor?
Done/Exit training?
Remove sensor?
<dial to highlight...>
Open-Close Sensor
Living Rm Window
Front Door
<press to select>
Open-Close Sensor
Living Rm Window
Front Door
Front Door
Silent awareness?
Alert me if opened?
Alert me if closed?
Front Door
Silent awareness?
Alert me if opened?
Alert me if closed?
180
182
183
184
186
187
188
190
191
192
194
196
198
200
201
202
204
205
206
207
104
208
209
210
212
213
154
150
214
216
218
220
221
222
224
225
226
227
228
230
132

Fig. 6A

Fig. 6B


FOB
6
BASE STATION
4
8,10,12
SENSOR
FOB_PIC
54
FOB_RF
58
BASE_RF
26
BASE_PIC
22
264
WAKEUP_request()
PICDATA_request(post_updates)
268
Data (post_updates)
270
Acknowledgement(SUCCESS)
272
PICDATA_indication(post_updates)
274
PICDATA_confirm(SENT)
276
Data (updates)
280
PICDATA_request(updates)
278
Acknowledgement(SUCCESS)
292
PIC_DATA_confirm(SENT)
284
266
TABLE
286
PICDATA_indication(updates)
252
SLEEP_request()
262
low_power_mode()
288
low_power_mode()
290
260
291
FIG. 7A
294
292
293
PIC_DATA_request(alert)
Data(alert)
PIC_DATA_confirm(OUT_OF_RANGE)
296
254
FIG 7B
297
298
299
250
PICDATA_request(data)
Data(data)
Acknowledgement(SUCCESS)
300
PICDATA_confirm(SENT)
302
256
FIG. 7C
FOB_PIC
54
FOB_RF
58
BASE_RF
26
BASE_PIC
22
8,10,12
SENSOR

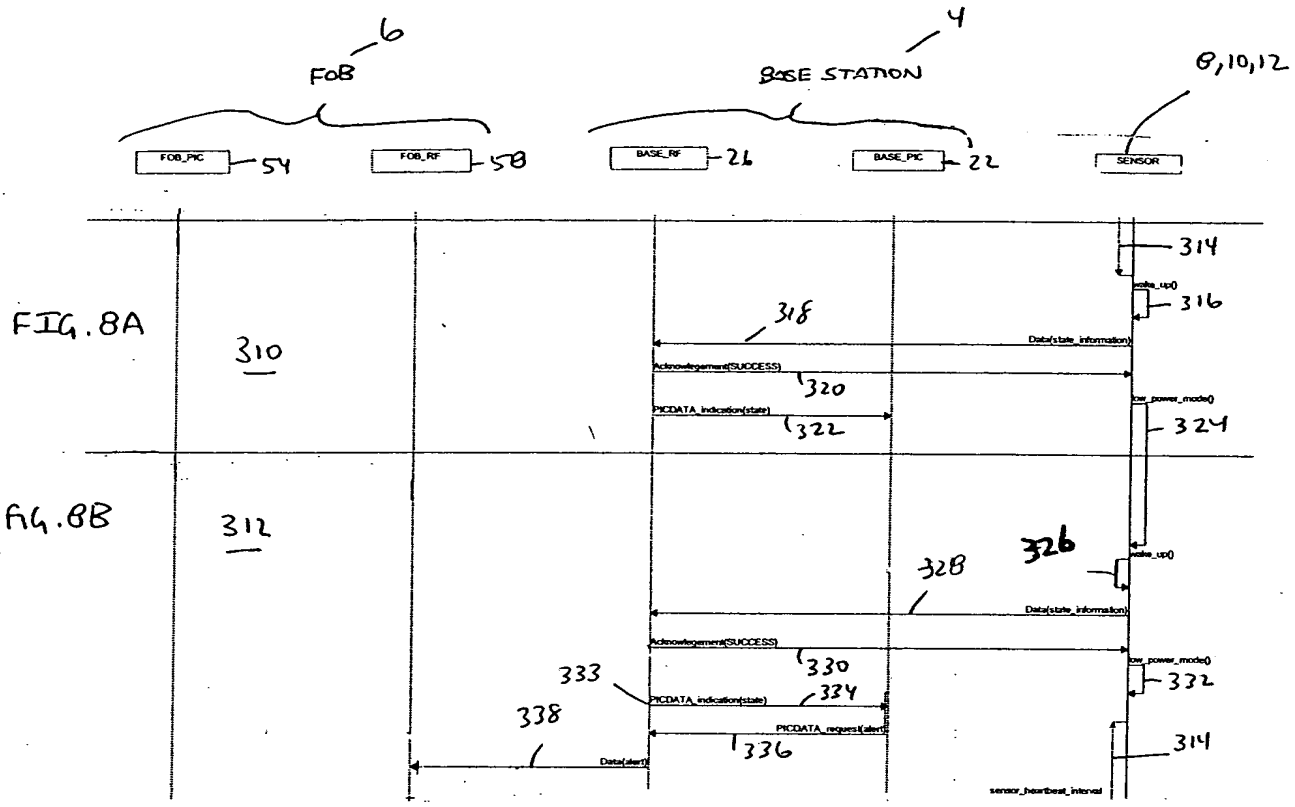
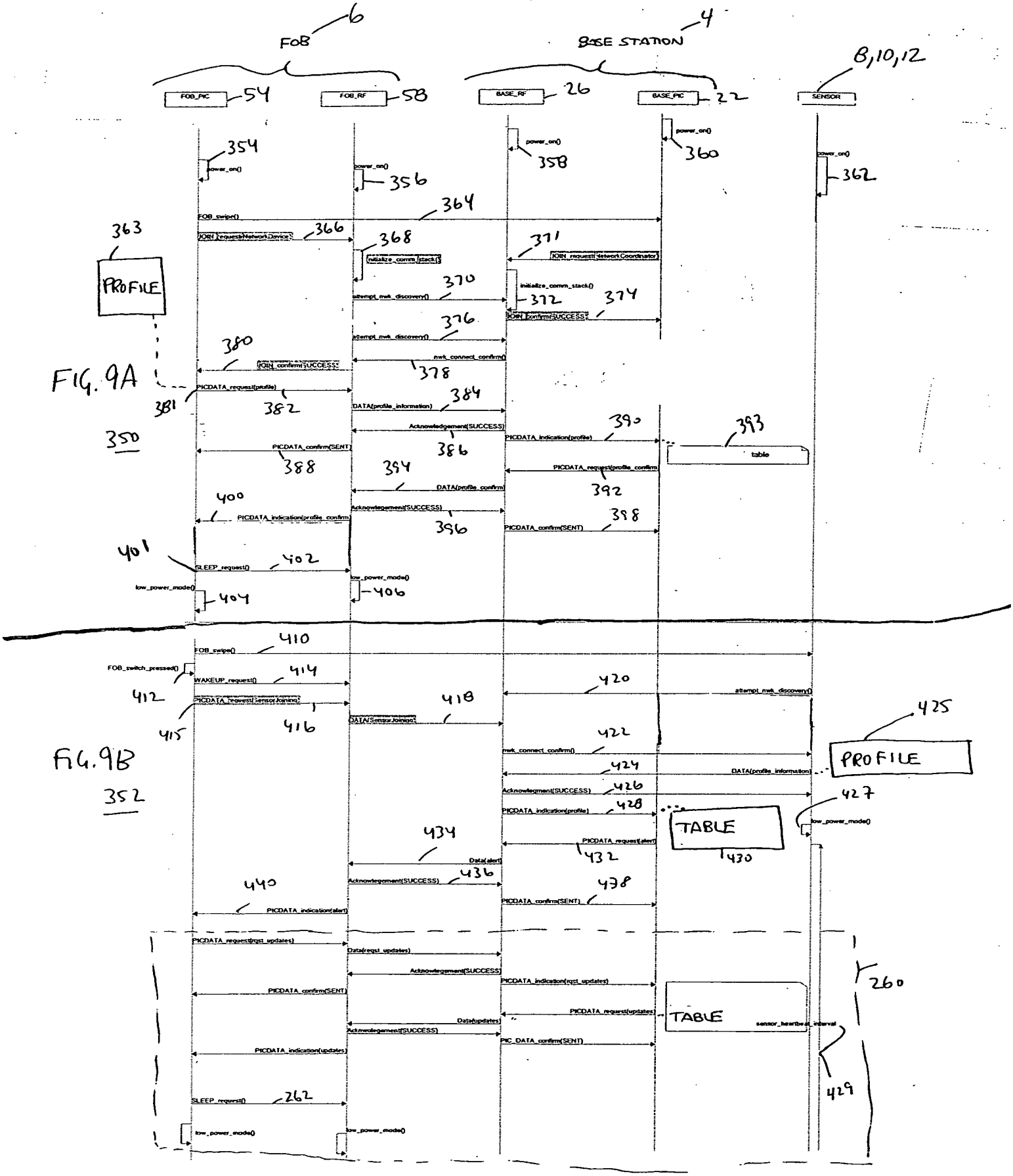


FIG. 8A

310

FIG. 8B

312


FOB
6
BASE STATION
4
8,10,12
FOB_PIC
54
FOB_RF
58
BASE_RF
26
BASE_PIC
22
SENSOR
power_on()
354
356
358
360
362
FOB_swipe()
364
JOIN_request(NetworkDevice)
366
368
initialize_comm_stack()
JOIN_request(NetworkCoordinator)
371
attempt_nwk_discovery()
370
372
374
JOIN_confirm(SUCCESS)
376
nwk_connect_confirm()
378
380
JOIN_confirm(SUCCESS)
363
PROFILE
PICDATA_request(profile)
381
382
DATA(profile_information)
384
Acknowledgement(SUCCESS)
386
PICDATA_indication(profile)
390
393
table
PICDATA_confirm(SENT)
388
PICDATA_request(profile_confirm)
392
DATA(profile_confirm)
394
Acknowledgement(SUCCESS)
396
PICDATA_confirm(SENT)
398
400
PICDATA_indication(profile_confirm)
401
SLEEP_request()
402
low_power_mode()
404
406
FIG. 9A
350
FOB_swipe()
410
FOB_switch_pressed()
412
WAKEUP_request()
414
PICDATA_request(SensorJoining)
415
416
DATA(SensorJoining)
418
attempt_nwk_discovery()
420
nwk_connect_confirm()
422
425
PROFILE
DATA(profile_information)
424
Acknowledgement(SUCCESS)
426
PICDATA_indication(profile)
428
427
low_power_mode()
TABLE
430
PICDATA_request(alert)
432
Data(alert)
434
Acknowledgement(SUCCESS)
436
PICDATA_confirm(SENT)
438
PICDATA_indication(alert)
440
FIG. 9B
352
PICDATA_request(rqst_updates)
Data(rqst_updates)
Acknowledgement(SUCCESS)
PICDATA_indication(rqst_updates)
PICDATA_confirm(SENT)
PICDATA_request(updates)
TABLE
sensor_heartbeat_interval
Data(updates)
Acknowledgement(SUCCESS)
PIC_DATA_confirm(SENT)
PICDATA_indication(updates)
260
429
SLEEP_request()
262
low_power_mode()
low_power_mode()

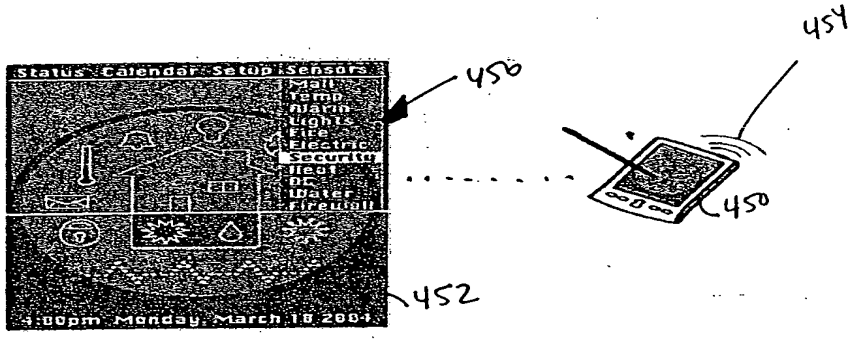

Status Calendar Setup Sensor
Mail
Temp
Alarm
Light
Fire
Electric
Security
Heat
AC
Water
Firewall
1:00pm Monday, March 18 2004
456
454
450
452

FIG. 10

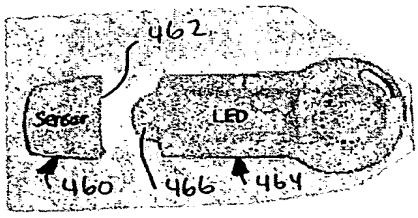


FIG. 13

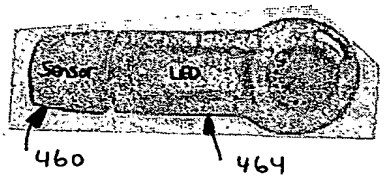


FIG. 14

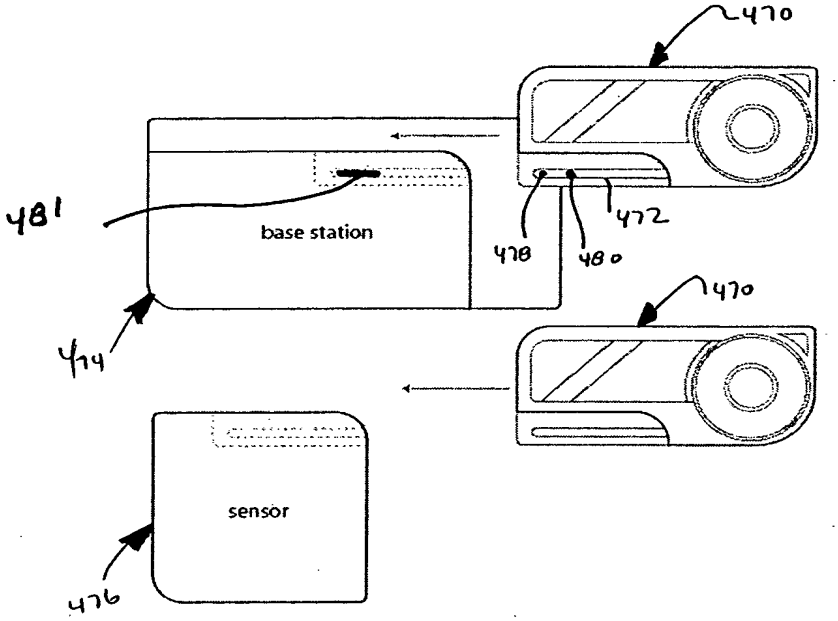


FIG. 11

FIG. 12

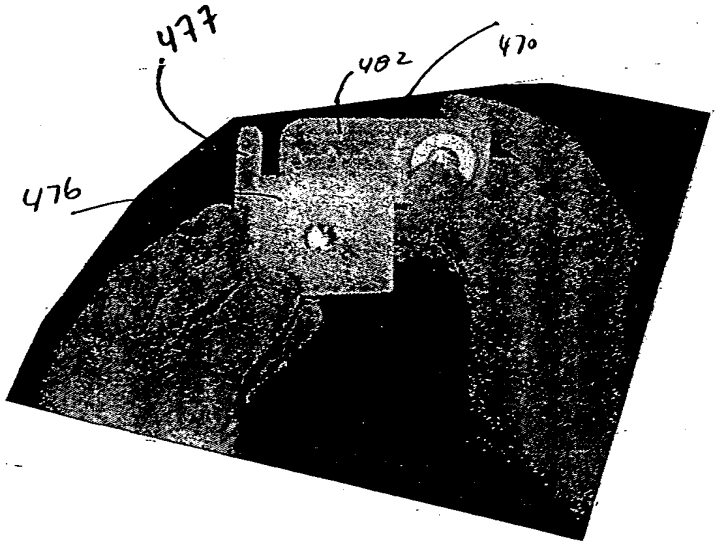


FIG. 15

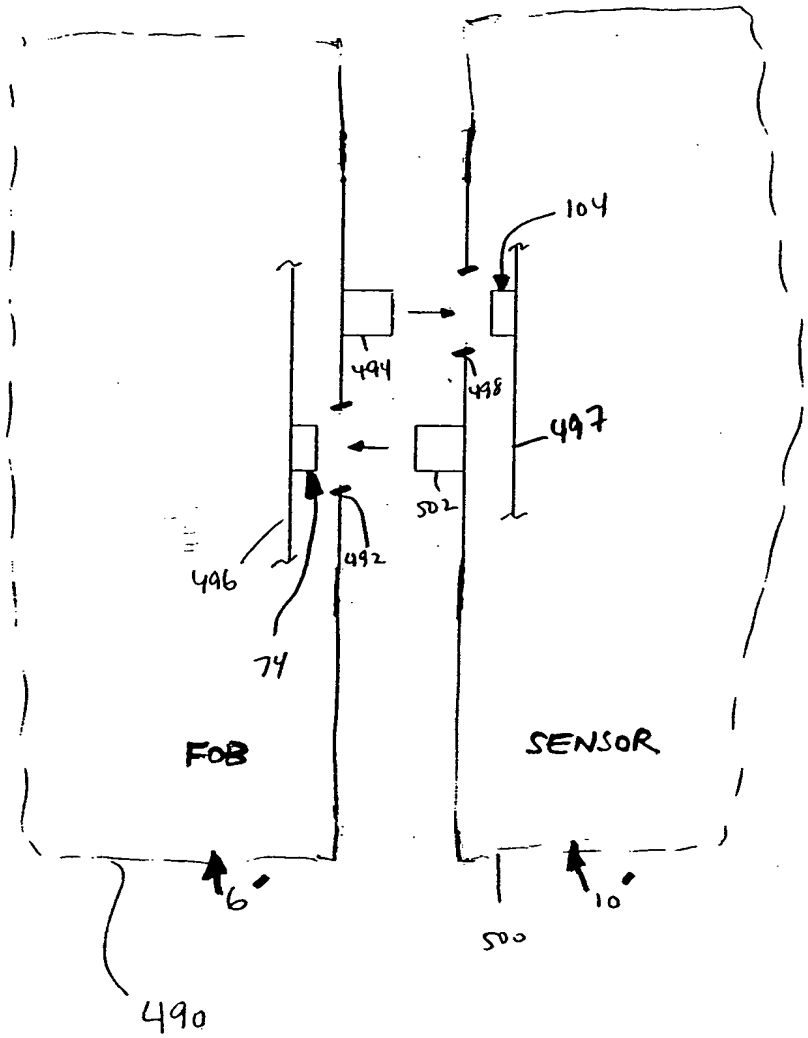


FIG. 16

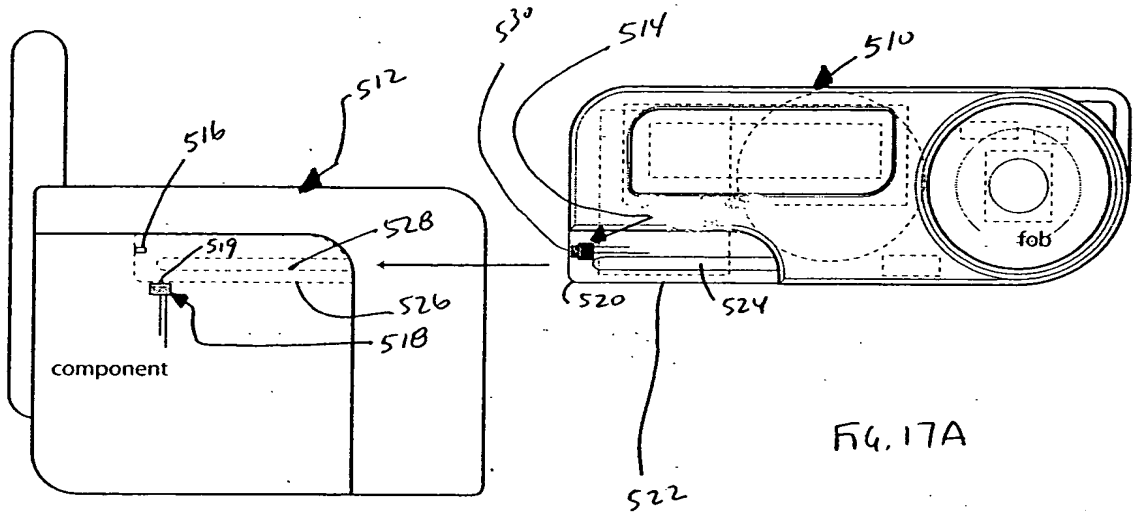


FIG. 17A

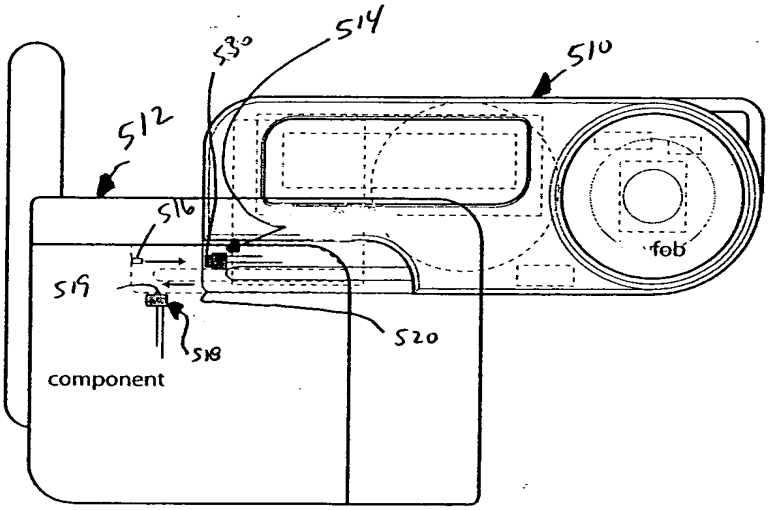


FIG. 17B

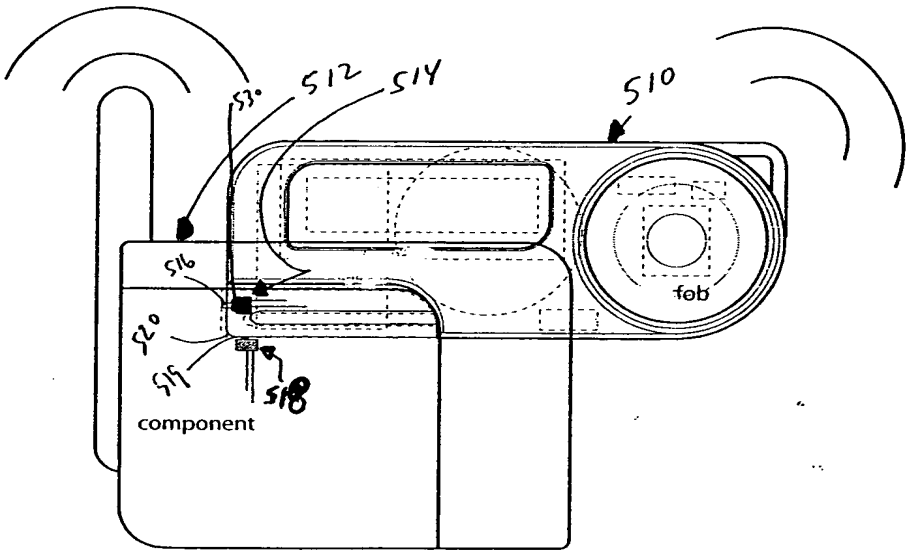


FIG. 17C